(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 April 2004 (08.04.2004)

PCT

(10) International Publication Number
WO 2004/030162 A3

(51) International Patent Classification[7]: G01N 23/04

(21) International Application Number: PCT/US2003/030499

(22) International Filing Date: 29 September 2003 (29.09.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/414,263 27 September 2002 (27.09.2002) US
60/461,209 7 April 2003 (07.04.2003) US

(71) Applicant *(for all designated States except US)*: **SCANTECH HOLDINGS, LLC** [US/US]; 430 Tenth Street, N.W., Suite N-205, Atlanta, GA 30318 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **ELYAN, Vladimir, V.** [RU/RU]; 45-56 Bolschaya Gruzinskaya str., Moscow 123056 (RU). **BEKHTEV, Boris, V.** [RU/RU]; 52-8, Verkhnie Polya str., Moscow 109369 (RU). **BOWSER, Gary, F.** [US/US]; 2702 CR 68, Auburn, IN 46706 (US). **SYCHEV, Boris, S.** [RU/RU]; 84-11 Millionstchikova str., Moscow, 115487 (RU). **UVAROV, Vitaly, A.** [RU/RU]; 105-40/3, Veyernaya str., Moscow 119501 (RU).

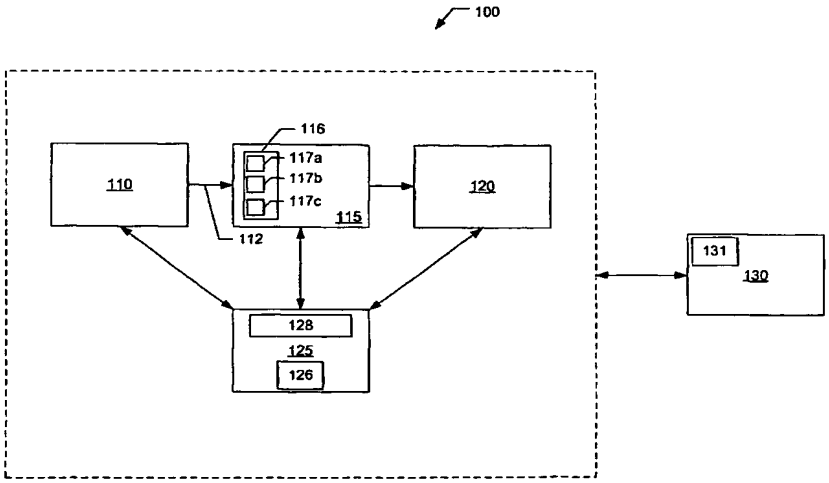
(74) Agent: **COURSEY, R., Stevan**; Troutman Sanders LLP, Suite 5200, 600 Peachtree Street, NE, Atlanta, GE 30308-2216 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: SYSTEM FOR ALTERNATELY PULSING ENERGY OF ACCELERATED ELECTRONS BOMBARDING A CONVERSION TARGET



(57) Abstract: A RF linear electron accelerator system for generating a beam of accelerated electrons bunched in pulses having different energy spectra from pulse to pulse. The system is operable to generate a beam of high energy X-rays from such beam of accelerated electrons, using a conversion target (225), with pulses of the X-ray beam (112) having energy spectra which are different from X-ray pulse to X-ray pulse. Preferably, the pulses of the electron beam (222) have energy spectra which alternate from pulse to pulse and, correspondingly, the pulses of the X-ray beam (112) have energy spectra which alternate from pulse to pulse. Also preferably, the current of electrons injected into the system's accelerating section (220) and the frequency of the pulse RF power supplied to the accelerating section (220) are changed in a synchronized manner to generate the electron beam (222). The system is employable in an inspection system (100) for discriminating materials present in containers by atomic numbers.

WO 2004/030162 A3

Published:
— *with international search report*

(88) Date of publication of the international search report:
24 June 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/30499

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01N 23/04
US CL : 378/63

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 378/63; 372/2, 30, 32, 24, 26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,101,239 (KAWASAKI et al) 08 August 2000 (08.08.2000), see the entire document	1-2

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 January 2004 (23.01.2004)	29 MAR 2004
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Paul Ip Telephone No. (703) 306-3329

Form PCT/ISA/210 (second sheet) (July 1998)

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

CORRECTED VERSION

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 April 2004 (08.04.2004)

PCT

(10) International Publication Number
WO 2004/030162 A3

(51) International Patent Classification[7]: G01N 23/04

(21) International Application Number:
PCT/US2003/030499

(22) International Filing Date:
29 September 2003 (29.09.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/414,263 27 September 2002 (27.09.2002) US
60/461,209 7 April 2003 (07.04.2003) US

(71) Applicant *(for all designated States except US)*: **SCANTECH HOLDINGS, LLC** [US/US]; 430 Tenth Street, N.W., Suite N-205, Atlanta, GA 30318 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **ELYAN, Vladimir, V.** [RU/RU]; 45-56 Bolschaya Gruzinskaya str., Moscow 123056 (RU). **BEKHTEV, Boris, V.** [RU/RU]; 52-8, Verkhnie Polya str., Moscow 109369 (RU). **BOWSER, Gary, F.** [US/US]; 2702 CR 68, Auburn, IN 46706 (US). **SYCHEV, Boris, S.** [RU/RU]; 84-11 Millionstchikova str., Moscow, 115487 (RU). **UVAROV, Vitaly, A.** [RU/RU]; 105-40/3, Veyernaya str., Moscow 119501 (RU).

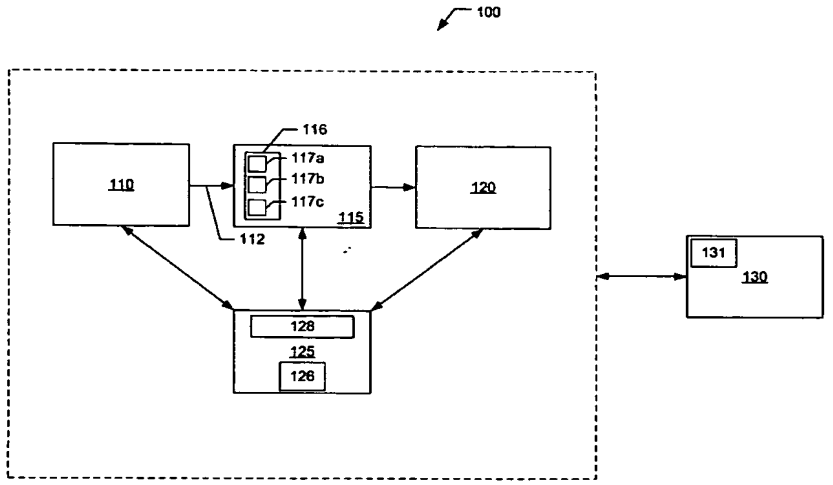
(74) Agent: **COURSEY, R., Stevan**; Troutman Sanders LLP, Suite 5200, 600 Peachtree Street, NE, Atlanta, GE 30308-2216 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: SYSTEM FOR ALTERNATELY PULSING ENERGY OF ACCELERATED ELECTRONS BOMBARDING A CONVERSION TARGET



(57) Abstract: A RF linear electron accelerator system for generating a beam of accelerated electrons bunched in pulses having different energy spectra from pulse to pulse. The system is operable to generate a beam of high energy X-rays from such beam of accelerated electrons, using a conversion target (225), with pulses of the X-ray beam (112) having energy spectra which are different from X-ray pulse to X-ray pulse. Preferably, the pulses of the electron beam (222) have energy spectra which alternate from pulse to pulse and, correspondingly, the pulses of the X-ray beam (112) have energy spectra which alternate from pulse to pulse. Also preferably, the current of electrons injected into the system's accelerating section (220) and the frequency of the pulse RF power supplied to the accelerating section (220) are changed in a synchronized manner to generate the electron beam (222). The system is employable in an inspection system (100) for discriminating materials present in containers by atomic numbers.

WO 2004/030162 A3

Declaration under Rule 4.17:
— *of inventorship (Rule 4.17(iv)) for US only*

Published:
— *with international search report*

(88) Date of publication of the international search report:
24 June 2004

(48) Date of publication of this corrected version:
24 March 2005

(15) Information about Correction:
see PCT Gazette No. 12/2005 of 24 March 2005, Section II

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.